National Institute of Environmental Health Sciences

Temperature-induced excess mortality in Moscow, Russia

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Abstract:

After considering the observed long-term trends in average monthly temperatures distribution in Moscow, the authors evaluated how acute mortality responded to changes in daily average, minimum and maximum temperatures throughout the year, and identified vulnerable population groups, by age and causes of death. A plot of the basic mortality-temperature relationship indicated that this relationship was V-shaped with the minimum around 18 degrees C. Each 1 degree C increment of average daily temperature above 18 degrees C resulted in an increase in deaths from all non-accidental causes by 2.8%, from coronary heart disease by 2.7%, from cerebrovascular diseases by 4.7%, and from respiratory diseases by 8.7%, with a lag of 0 or 1 day. Each 1 degrees C drop of average daily temperature from +18 degrees C to -10 degrees C resulted in an increase in deaths from all non-accidental causes by 0.49%, from coronary heart disease by 0.57%, from cerebrovascular diseases by 0.78%, and from respiratory diseases by 1.5%, with lags of maximum association varying from 3 days for non-accidental mortality to 6 days for cerebrovascular mortality. In the age group 75+ years, corresponding risks were consistently higher by 13-30%. The authors also estimated the increase in non-accidental deaths against the variation of daily temperatures. For each 1 degrees C increase of variation of temperature throughout the day, mortality increased by 0.3-1.9%, depending on other assumptions of the model.

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Resource Description

Exposure :

weather or climate related pathway by which climate change affects health

Temperature

Temperature: Extreme Cold, Extreme Heat, Fluctuations

Geographic Feature:

resource focuses on specific type of geography

Urban

Geographic Location:

resource focuses on specific location

Non-United States

Non-United States: Europe

European Region/Country: European Country

Other European Country : Russia

Health Impact: ☑

specification of health effect or disease related to climate change exposure

Cardiovascular Effect, Morbidity/Mortality, Respiratory Effect

Cardiovascular Effect: Other Cardiovascular Effect

Cardiovascular Disease (other): ischemic heart disease mortality; angina pectoris mortality; cerebrovascular mortality

Respiratory Effect: Other Respiratory Effect

Respiratory Condition (other) : respiratory disease mortality

Population of Concern: A focus of content

Population of Concern: ☑

populations at particular risk or vulnerability to climate change impacts

Elderly

Resource Type: ☑

format or standard characteristic of resource

Research Article

Timescale: ☑

time period studied

Time Scale Unspecified